ZANZIBAR PROTECTORATE

Annual Report

of the

Department of Agriculture

1955

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ZANZIBAR PROTECTORATE

Annual Report of the Department of Agriculture, 1955

SECTION A. AGRICULTURE IN THE PROTECTORATE

1. General

The year 1955 was particularly free from events of striking agricultural or economic importance, and the general level of prosperity, though slightly lower than it has been during recent years, was much more stable. Although the clove crop picked in the seasonal year July 1953 to June 1954 was the second highest on record, the 1954-55 crop amounted to about five-sixths of an average year's production and, by the end of 1955, the cloves that had already reached the market showed that the 1955-56 crop would slightly exceed the average. The production of coconuts, copra and coconut oil which constitutes the Protectorate's only other major industry was slightly smaller than that in each of the two previous years but was, nevertheless, slightly greater than normal.

Once again the total value of the clove and coconut products exported amounted to about 98 per cent of the value of the total exports of the Protectorate. The market values of these products however were not subject to such wide fluctuations as have been experienced during recent years, but there was a tendency for prices to move downwards and at the end of the year they were about 10 to 17 per cent lower than they had been in January. The absence of large fluctuations in clove prices during the year and the reaping of crops of average size had an important effect in reducing the amount of rash speculation which became far too prevalent when market conditions were less stable.

The production of home grown foodstuffs is always far from sufficient to support the Protectorate's population and, in Pemba, which possesses limited land suitable for food crop cultivation and which always suffers from an influx of thousands of clove pickers from Zanzibar whenever there is a large harvest, prices of foodstuffs are always higher than they are in Zanzibar. In 1955 locally grown foodstuffs were produced in good normal quantities. Any deficiencies were made up by ample supplies of imported foodstuffs and imported rice, the most popular staple starchy food, was comparatively cheap.

2. Weather

Although the *masika* rains were a little late in arriving they followed a dry season that had enjoyed occasional showers and were themselves prolonged and heavy. The majority of rainfall stations in Zanzibar island

recorded 30 inches or more of rain in the two months April and May, while Makunduchi in the south of Zanzibar received the exceptional amount of 48 inches. In Pemba rainfall was even heavier, a number of stations in the south recording over 50 inches in the two months, while Chake Chake showed a record precipitation of 91.63 inches in the three months April to June. Rainfall in the first half of the year was thus abundant and well distributed and provided ideal conditions for the planting of cloves and other tree crops. Rice also benefited for dry weather set in when the crop was ready for harvest.

Dry weather is normal at the middle of the year, but on this occasion it was prolonged until November, many areas receiving no more than 5 to 6 inches during the four months' period from July to October. As a consequence planting of the autumn pulses was made difficult and grazing became short. The south of Zanzibar Island suffered particularly in this respect, Makunduchi, for example, having a rainfall of no more than 1.62 inches in the five months from July to November. The *vuli* rains of November and December, although light, were generally adequate and the year closed with most stations having received a total rainfall that was about average. Chake Chake and Mtambile in Pemba, however, with 136.99 inches and 110.15 inches respectively were well above their average of 76.94 and 92.83 inches.

Rainfall figures for the several stations in Zanzibar and Pemba are shown as Appendix V to this report.

3. Principal Crops

Cloves.—The crop for the seasonal year from July, 1954 to June, 1955, which had been estimated in last year's annual report at 350,000 frasilas,* reached a total of 546,871 frasilas, which is only one-sixth less than the 35-year average of 631,873 frasilas. Following on the previous year's crop which was the second largest since recording began in 1895, this was a satisfactory result, and may reflect in some degree the improved attention given to care in picking during recent years, although a pair of years with very similar crops also occurred in 1943 to 1945. By the end of 1955, however, the current 1955-56 crop had reached 629,960 frasilas which lends further weight to the suggestion made above. A most satisfactory position will have been attained if through proper care of the trees a greater evenness in bearing may be obtained.

Open market prices, which in January averaged Shs. 238 per 100 lb., declined steadily until May when they had dropped to Shs. 206; this price was maintained for two months and rose slightly in July but thereafter dropped again to Shs. 200 in September, at which figure it remained stationary for the rest of the year. The Clove Growers' Association's guaranteed minimum buying price remained unchanged throughout the period at Shs. 200 per 100 lb. fair quality cloves in Zanzibar and Shs. 195 in Pemba. As a consequence, increasing quantities were offered for sale to the Association, which for the first time for several years began to hold stocks of its own. Regulations provide that exporters must

* 1 frasila = 35 lb.

include in their consignments a prescribed proportion of cloves purchased from the Clove Growers' Association, and while in recent years prescribed proportion has been nil, the purchase of supplies during 1955 by the Clove Growers' Association necessitated the inclusion of Association stocks in export consignments. The proportion was fixed at one tenth as from 1st March, one quarter as from 1st October, and one half from 1st January 1956. These stocks are sold to exporters at controlled prices which remained unchanged throughout the period, the price for Grade II cloves, of which the crop almost entirely consists, being Shs. 245 per 100 lb.

Export duty on cloves remained unchanged at Shs. 66 per 100 lb. until the end of the third quarter of the year and from 1st October was reduced to Shs. 64 per 100 lb. 11,246 tons of cloves were exported during the calendar year, of which 59.57 per cent went to Indonesia and 23.51 per cent to India. Exports to Indonesia amounted to 6,675 tons and constitutes a record for direct exports to that country, the 10-year average for 1946-55 being 4,415 tons.

The Clove Growers' Association continued to buy all clove stems offered to them at a fixed price of Shs. 17/50 per 100 lb. for commercial quality, export of stems from the Protectorate being prohibited. 193,771 lb. of clove stem oil were distilled and exported by the Association of which 62.4 per cent went to the United Kingdom and 34.5 per cent to the United States of America, as compared with 76.7 per cent and 16.7 per cent respectively in 1954.

Coconuts and Copra.—In 1954 India came strongly into the market for Zanzibar copra whereas formerly the bulk of the exports went to Continental Europe with fair quantities also going to East Africa; this trend was increased in 1955, when approximately 63 per cent went to India. The quality of this exported copra continues to be good and there is no doubt that it is gaining a firm place in the more discriminating markets. Much of the local production, however, still remains sub-standard and is disposed of locally for milling. Over 82 per cent of the oil exported went to the East African mainland.

Exports of coconut products for the year are shown in the following table: —

	Exports tons	*Copra equivalent tons*
Coconut oil	3,710	6,183
Coconut cake ...	3,059	—
Soap	4	4
Copra	5,406	5,406
Total ...	12,179	11,593

In addition some 22,971 cwt. of coconuts were exported, roughly equivalent to 263 tons of copra, making 11,856 tons in all.

The trend of exports in coconut oil and copra expressed as tons of each is seen from the following table: —

	1951	*1952*	*1953*	*1954*	*1955*
Coconut oil	5,208	5,263	4,741	3,963	3,710
Copra	25	2,508	5,813	5,805	5,406

Local market prices of copra continued the decline which was experienced in 1954 dropping from Shs. 47 per 100 lb. in January to Shs. 34 in June and then rising slightly to Shs. 41 at the end of the year. Prices of unhusked coconuts in Zanzibar which ranged from Shs. 120 to Shs. 140 per thousand according to quality and other factors at the beginning of January, dropped to a range of Shs. 75 to Shs. 90 in May, rose again to Shs. 100 to Shs. 125 in July, and finished the year at Shs. 100 to Shs. 115.

The Copra Board, which administers the proceeds of the cess on exported coconut products, continued to give assistance to coconut growers through the provision of coconut seedlings, as described elsewhere in this report, and to copra makers by selling at cost price the materials required for the construction of kilns and providing free the service of masons to construct them. Further, an instructional service is provided which advises on the production of good copra and the construction of kilns. This work is undoubtedly having a beneficial effect on the copra of the Protectorate. In addition, the Copra Board continued its work with coconut products at its factory, producing a high quality oil and disposing of its first lots of coir fibre, both for mattress and brush making. The production of coconut shell charcoal was found to be uneconomic and was abandoned. The production of coir fibre is gaining in importance as a territorial industry, and with the introduction of improved machinery, particularly high-pressure balers, the industry should play a useful part in the Protectorate's economy.

4. Minor Export Crops

The general position of the minor export crops in the economy of the country remained unchanged in 1955, and their value represented no more than one per cent of the total value of all agricultural exports. Nevertheless, a sound and substantial export trade in agricultural commodities to supplement clove and coconut products remains an important goal of the department.

With the encouragement given by the 1954 rise in prices of chillies on the open market planting increased markedly as noted elsewhere in this report and exports almost doubled, reaching 49 tons as compared with $25\frac{3}{4}$ tons in 1954. Of this total, 73 per cent went to the United Kingdom, 24 per cent to Australia and the remainder to Canada and New Zealand.

The Clove Growers' Association maintained its guaranteed minimum buying price for chillies at Shs. 70 per 100 lb. but with the open market price ranging between Shs. 200 and Shs. 250 per 100 lb. the Association was not called upon to buy.

The trade in coil tobacco, the production of which has for long been carried on by the people of the east coast of Zanzibar, suffered a serious setback when Somalia, which had been the sole purchaser, decided in May to prohibit further imports. By this date $41\frac{1}{2}$ tons had been exported bringing to the producers a gross return of about £3,476. The situation has not yet been rectified but approaches have been made to the Government of Somalia.

Derris exports amounted to 1,656 lb. only, the greater part of this coming from the department's farms. A small quantity of cacao beans, also largely from Government plantations, was despatched to the United Kingdom.

The production of dried seaweed for export was adversely affected by the prolongation of the *masika* rains which hampered harvesting in July. Nevertheless production maintained its upward trend and exports for the year reached 221 tons as compared with 186 tons in 1954.

5. Food Crop Production

The department's field staff once again made every effort to encourage growers to plant adequate amounts of food crops, in particular the two staple crops, rice and cassava. Compulsory planting orders were again made in respect of the former but not, this year, for cassava. Success in the efforts to encourage rice growing was made more difficult of attainment by the continued presence in the shops of relatively cheap imported rice Nevertheless a 25 per cent increase in acreage as compared with 1954 was attained in Zanzibar and a 2 per cent increase in Pemba. The crop developed well in both islands, and the estimated production of almost 11,000 tons, was 56 per cent above the estimate for 1954, but was still less than what used to be considered a normal crop.

The harvests of cassava and other staple crops such as sweet potatoes, bananas, yams and sorghum were normal and adequate. On the other hand, the maize crop in the coral areas of the south of Zanzibar where it is the principal food crop grown, yielded poorly owing to inordinately heavy rain —48 inches in 2 months—and an attack of *Puccinia polysora* rust.

There was a marked decrease in the quantities of produce brought to the Zanzibar town market for sale, vegetables, fruit and staple starchy foods all showing a considerable reduction on supplies in 1954. This was particularly the case in the last quarter of the year when the quantity of fruit was only a little more than one third of the quantity offered during the same period of 1954 while vegetables were only half as plentiful. Prices of fruit and starchy foods rose by 13 per cent and 24 per cent respectively but prices of vegetables showed a 2 per cent drop over the year. Quantities passing through the market are shown in the following table:—

	1953	*1954*	*1955*
Vegetables, baskets	77,695	95,188	75,408
Average price per basket	*Shs.* 4.53	*Shs.* 5.85	*Shs.* 5.76
Fruit, baskets	155,570	161,758	118,983
Average price per basket	*Shs.* 4.38	*Shs.* 5.90	*Shs.* 6.63
Staple starchy foods, baskets	157,092	197,402	156,252
Average price per basket	*Shs.* 8.08	*Shs.* 7.10	*Shs.* 8.83

6. Animal Husbandry

The year 1955 was notable for four outbreaks of three serious diseases, rinderpest, anthrax and foot-and-mouth disease, but all were checked and brought under control. Three of the outbreaks were brought into the country by livestock which had been imported for slaughter. The occurrences illustrate not only the risks attendant upon importing stock but also

the value of quarantine measures, for in each case the disease was diagnosed while the animals were in quarantine immediately after their arrival in the country. Had they not been so confined the stock owners in the Protectorate might have suffered very serious losses. As it was the relatively close proximity of the Pigaduri quarantine to other cattle and in particular those of the Mtoni dairies resulted in foot-and-mouth disease spreading to the dairies; while the lack of a fully controlled alternative quarantine resulted in a dangerous situation when other imported animals placed in a temporary quarantine at Chukwani were found to be infected with rinderpest.

The foot-and-mouth disease outbreak occurred in February and reduced the milk production of the Mtoni dairies to half the normal figure for a period of about a month. No adult cattle died but a few never completely regained their milk yield and were subsequently sold for slaughter. The disease proved fatal to calves under one month. Precautionary measures prevented its spread beyond a limited area on the borders of Zanzibar town. The virus was identified as type "O". In Pemba also, foot-and-mouth disease broke out in February in the north of the island spreading as far as Wete while a second outbreak occurred in the east and centre of the island some ten days later. Movements of stock were prohibited and other control measures taken and within a few weeks the disease subsided. It is assumed that the virus causing outbreaks was also type "O". In October another outbreak of foot-and-mouth disease—diagnosed as type "A"—was reported from Dar es Salaam. To prevent the disease from spreading into Zanzibar the importation of animals and meat from Dar es Salaam was temporarily prohibited and 1,021 cattle were inoculated around the quarantine station in Zanzibar, so as to create a protective barrier as an additional precautionary measure against the time when importations were resumed. The department is greatly indebted to the Veterinary authorities in Dar es Salaam for their active co-operation in preventing the disease from reaching the Protectorate.

Earlier in the year rinderpest was diagnosed in slaughter cattle imported from Somalia which had been placed in a temporary quarantine at Chukwani because foot-and-mouth disease existed in the Pigaduri quarantine. Owing to the danger of possible contact between the Somali cattle and local cattle in the Chukwani neighbourhood it became necessary to inoculate these latter as well as others in a wide band around them. It is to the credit of the people in these areas that their cattle were willingly and rapidly brought in for inoculation and within a few days 2,586 animals were given lapinised virus supplied from Kabete. There were no casualties following inoculation and the disease did not spread. The Veterinary authorities in Somalia have now agreed to inoculate all cattle destined for Zanzibar.

In October a shipment of sixty-eight sheep and goats arrived at Wete from Tanga. The animals were put into the Wete quarantine station and, within two days, eleven had died from Anthrax. The remainder of the animals were promptly slaughtered and buried within the station. No other casualties occurred and the affected paddock after being limed and cultivated is now closed.

In 1955 there was a reduction in the numbers of slaughter stock imported into Zanzibar and Pemba from the mainland which was largely due to the temporary import restrictions imposed for the control of disease. The tendency for Somalia to increase in importance as a source of supply of slaughter stock, particularly goats, continued, this territory supplying 11 per cent of the cattle and 43 per cent of the goats. The remainder came from Tanganyika. The following table shows the numbers imported for slaughter in 1955 and previous years:—

	1952	*1953*	*1954*	*1955*
Cattle	3,463	5,208	4,784	4,066
Goats	11,111	14,519	14,889	11,964
Sheep	2,100	2,501	2,150	1,442

The numbers of local stock slaughtered at the Zanzibar town abattoir showed an increase over 1954 because of the greater need of the butchers to obtain stock locally when imports were restricted. The following tables show the numbers of animals recorded as having been slaughtered for meat:—

Zanzibar Town Abattoir

	Oxen	*Cows*	*Calves*	*Goats*	*Sheep*	*Pigs*	*Camels*
Local stock ...	460	243	127	3,523	—	—	—
Imported stock ...	3,158	43	2	10,608	2,120	—	3
1955 Total ...	3,618	286	129	14,331	2,120	—	3
1954 Total ...	3,958	85	69	15,030	2,232	7	—
1953 Total ...	3,653	159	20	2,685	2,250	6	—

Zanzibar Rural Districts.

Accurate figures are not available.

PEMBA

	Cattle	*Sheep*	*Goats*
Townships	1,798	136	795
Rural areas	2,256	2	273
1955 Total	4,054	138	1,068
1954 Total	3,436	246	921
1953 Total	3,997	371	1,318

The preparation of hides and skins at the Government drying shed in Zanzibar town continued and the following numbers were dealt with during the year:—

	Hides	*Skins*
From abattoir ...	3,357	13,383
From Rural areas ...	416	2,892
1955 Total	3,773	16,275
1954 Total	4,699	20,544
1953 Total	4,349	18,107

In Pemba the preparation of hides and skins was in the hands of local butchers and no figures are available.

SECTION B. THE WORK OF THE DEPARTMENT OF AGRICULTURE

1. Staff

The Director, Mr. A. K. Briant, returned from leave in April and Mr. G. E. Tidbury, who had been in charge of the department since the preceding November then reverted to his substantive post of Senior Agricultural Officer. He proceeded on leave in November 1955. During the periods when the Director or Mr. Tidbury were on leave, Mr. R. K. Tremlett undertook the duties of Senior Agricultural Officer and for the remainder of the year was in charge of Zanzibar District. Mr. D. W. Winter was in charge of Pemba District for the whole of the year and was assisted by Mr. J. B. de Souza, Field Officer, who was appointed in March. Mr. G. I. Walker arrived on first appointment as Agricultural Development Officer in March and worked at Kizimbani and in Zanzibar District, taking charge of the latter in November. Kizimbani Experimental Farm was under the continuous supervision of Mr. K. A. Bowden, for the second year in succession. He was assisted from March onwards by Mr. Y. O. K. Hassania, Field Officer, a new appointment.

Dr. F. L. Vanderplank, Entomologist in charge of Coconut Pest Research, was on duty throughout the year as were Mr. Ahmed Rashid, Veterinary Officer, Mr. A. C. E. Callan, M.B.E., Inspector of Produce, Mr. K. F. King, Fisheries Officer, Mr. T. E. C. Robins, Manager, Experimental Control of Clove Diseases, Mr. Othman Shariff, Assistant Agricultural Officer in charge of Tsetse and Trypanosomiasis Survey, and Mr. L. J. Stevens, Field Assistant to the Entomologist.

Mr. T. A. Couppis, Forest Officer, returned from leave in March, the forestry section having been supervised in his absence by Mr. A. A. Wadud. Mr. I. G. C. Squire, Field Supervisor of the Fruit Scheme, returned from leave in June, and in August, in addition to his substantive duties, took over management of the Government Plantations, Mr. Ali Khamis, Plantation Manager, then going on leave.

In August the post of Chemist, which had been vacant for five years, was filled by the appointment of Mr. J. Jago. In August and September Mr. J. R. Clarke and Mr. J. Proudlove arrived on first appointment as Supervisor and Mechanical Superintendent respectively of the Rice Scheme. Mr. P. Downing, Forester, arrived on first appointment in October. Mr. O. de Manbey, Agricultural Development Officer, completed his contract and left the department in July.

Mr. M. A. Ghassany, Assistant Agricultural Officer, who had been studying in the United Kingdom since 1952, returned to Zanzibar in August and began concentrated extension work in a limited number of selected villages. Mr. Mohamed Hamed, Field Assistant, who had also been in the United Kingdom for a one year's course returned to Zanzibar in November and was given special work in connection with ranching schemes. Three other officers of local origin were also studying abroad, two in England and one in India, during the year.

With the appointment of a chemist, a forester, an agricultural development officer, two officers for the Rice Scheme, and two field officers, and the return of two officers from special studies in the United Kingdom, the staff position in respect of field and specialist officers showed a very welcome improvement in 1955.

Mr. L. Paul, Office Superintendent, was in charge of the Head Office clerical staff and assisted the Director throughout the year.

Sheikh Said Omar el-Jabir, a Field Assistant of 34 years' service with the department, retired at the end of the year. Sheikh Salim Mohamed el-Mauli, who retired at the end of 1954 after 34 years' service with the department, was appointed a member of the order of the Brilliant Star, 4th Class, on the occasion of Id-el-Fitr 1374.

2. The Development Programme

The 10-Year Development Programme, which commenced in 1946, drew to its close at the end of 1955. A new programme of 5 years development to cover the period from 1st January, 1955 to 31st December, 1959 and thus to overlap with the first programme was approved by Legislative Council in August.

The Rice Cultivation Scheme, which was approved by the Secretary of State in 1953, started operations in 1955 after the recruitment of supervisory staff. The stock-raising project at Tunguu which was approved in 1954 also commenced in 1955. Existing schemes continued on the same lines as in 1954 with the exception that the Tsetse and Trypanosomiasis Survey Scheme was not continued in its original form into 1955. The year's work in the various spheres of development is described in the following sections.

3. Crop Husbandry

Cacao.—Following the change of policy adopted in 1954 when it was decided to concentrate work upon the more robust *forastero* variety in place of the higher quality *criollo* variety, only *forastero* was planted in the district nurseries, and two trials with this variety were laid down at Kizimbani to test manurial treatments and spacing. Experimental production of clonal material in a solar propagator using sand and coir fibre continued and successful first attempts were made at air-layering using alkathene tubular film.

Cassava.—Work on Amani hybrid varieties at Kizimbani Experimental Station continued on the lines followed in preceding years, the varieties being tested for yield, apparent resistance to mosaic and streak diseases and palatibility. Similar work was done at minor centres under conditions different from those at Kizimbani. Of the twenty-two varieties received from Amani in 1950, three have been selected for mass propagation and some twelve acres were planted with the varieties for bulking and subsequent distribution. Fair quantities of planting material were given free

to fifty-four growers. Of the eleven varieties received in 1953, which are crosses of *Manihot glaziovii*, *M. dichotoma* and *M. saxicola* with cassava, four have been discarded and the remaining seven were planted in a replicated trial. Inspection of the plants after three months showed mosaic infection ranging from one per cent to thirty-six per cent. Manurial trials with artificial fertilisers were undertaken and the question of a correlation between fertilisers and mosaic infection is being investigated.

Chillies.—Public demand for chillie seedlings which are issued free by the department increased greatly during the year and the department's nurseries which are financed by the Clove Growers Association extended accordingly. Over 650,000 seedlings were issued in Zanzibar as compared with 204,000 in 1954, and 7,500 were given out in Pemba. A half-acre plot planted at Kizimbani in the autumn of 1954 and manured well came into bearing in February and was harvested continuously until the end of the year with heaviest cropping in June and July. It yielded at the rate of 1,239 lbs. of dry chillies per acre by the end of the year and is expected to crop less heavily in its second year. Crows took considerable quantities of the crop, and indeed, in certain parts of Zanzibar their depredations have so discouraged growers that they have stopped growing the crop.

Citrus.—1955 saw the third and last annual distribution of citrus plants under the Citrus Fruit Industry Scheme. The table below, which shows for the three years the total number of plants issued for first plantings and does not include any replants that were made, shows the satisfactory position that was attained.

	Target		*Planted*	
Variety	*Trees*	*Acreage*	*Trees*	*Acreage*
Oranges	21,000 ...	300 ...	20,688 ...	295
Grapefruit	2,500 ...	50 ...	3,082 ...	62
Limes	57,000 ...	300 ...	57,536 ...	301
Mandarins	3,500 ...	50 ...	3,169 ...	45
Total ...	84,000 ...	700 ...	84,475 ...	703

Also planted under the Scheme were 722 budded mangoes, of which 451 were issued in 1955.

The growth of the trees in the field is variable, but some of the best of the 1953 plantings have done very well and are now fruiting. Bonus payments were again made on all those which had been properly maintained, 189 people receiving nearly £3,000 for the season. As an indication of the degree to which growers have obtained bonus payments on their plantings, it is of interest to record that out of 57,202 budded limes planted, bonus payments were made in 1955 on 37,368 plants. Of the 20,000 which were rejected, 13,000 were in plots which were damaged by fire or were completely neglected largely in the first two years of the scheme. The remaining 7,000 refer to individual plants which were found to have made poor growth, to have died, or to have reverted to rough lemon or to be missing since the previous year's examination of the plots. Losses by fire in 1955 were fortunately less than in 1954.

"Wither-tip" of limes remains the serious problem that it was expected to be as soon as its presence was made known. Trials with copper sprays are being undertaken but a satisfactory control has not yet been obtained. In a plot of seedling limes established at Kizimbani it appears that a few trees show a marked resistance to the disease. This observation is being followed up.

Cloves.—Work under the scheme for the Experimental Control of Clove Diseases continued, the four trials in Zanzibar being planted with cloves according to plan. These trials are designed to test whether, by suitable treatment of the soil, cloves planted in areas where "sudden death" disease has destroyed mature plantations may attain maturity without succumbing to the condition known as "slow-decline", which has been a feature of new plantations established in such areas. In Pemba sites were sought for experiments designed to test the possibility of arresting active outbreaks of "sudden death".

Demonstrations of the control of "die-back" of cloves by means of pruning and the protection of exposed tissues, which had been in operation in Pemba since 1953 were extended to Zanzibar where eleven plots in private ownership and in prominent positions were treated. As a result of these demonstrations and the continued publicity that has been given to the subject, a demand is now arising for organised treatment of clove plantations on these lines on a wide scale. It has been noticeable in the Pemba demonstration plots that the amount of retreatment of diseased parts of trees is decreasing and it seems clear that infection within the tree can be controlled. Moreover it has been demonstrated that striking improvements in health and bearing can be obtained by these methods in trees which were severely affected by the disease some three to four years previously.

At Kizimbani Experimental Station investigational work on cloves followed a number of lines, particular stress being laid on the establishment of young cloves under shade and the maintenance of weed-free plantations through mechanical cultivation. On this latter aspect a non-replicated comparison of weed control by rotavator, Kraus disc, Marden weed cutter and hand hoeing was commenced.

The drying of harvested cloves may be a matter of considerable difficulty if wet weather is experienced for more than a few days, and much loss of quality may occur in these circumstances. This problem is now being investigated by the Clove Growers' Association at Kizimbani by experimenting with artificial drying in a pyrethrum-type drier and with sun drying on trays sliding on racks which can be quickly moved under or out of cover according to brief changes in the weather. Both methods show promise.

The department aided by funds provided by the Clove Growers' Association continued to produce clove seedlings for issue to the public both for sale at five cents each and for free issue, and production was increased by one third. The production of free seedlings for the Association's

rehabilitation schemes was continued. From seven nurseries in Zanzibar and twenty in Pemba, seedlings were distributed as shown in the following table:—

	Free	*Sold*	*Total*
Pemba	81,094	109,204	190,298
Zanzibar Island	24,801	169,845	194,646
Total ...	105,895	279,049	384,944
1954 Total ...	112,475	168,633	281,108
1953 Total ...	57,516	185,683	243,199

Coconuts.—Coconut seedlings were again produced, on behalf of the Copra Board, and sold to the public at ten cents each, a rate which is rather less than a quarter of the cost of production. From eight nurseries in Pemba and seven in Zanzibar a total of 139,401 seedlings were issued, of which 47,758 were distributed in Pemba and 91,643 in Zanzibar. One thousand King dwarf coconut seeds, obtained by the Copra Board from Malaya, were planted for trial at Kizimbani.

In investigational work on the sucking bug *Pseudotheraptus wayi* which causes nutfall and distortion of the fruit, conclusions tentatively arrived at in 1954 were strengthened by results obtained in 1955; namely, that 10 DRDK, which is a formulation of DDT and resin in diesel oil and kerosene, can considerably reduce the damage caused by the bug and produce large increases in the yield of nuts.

Coffee.—Interest in coffee is increasing in both Pemba and Zanzibar and nursery production of *liberica* seedlings was expanded to meet the expected demand. Some 12,400 seedlings were sold in 1955. At Kizimbani a manurial trial on young *liberica* coffee which is being carefully pruned is giving very good responses to the treatments; mulching has increased the yield by more than fifty per cent and raised the gross return from Shs. 583/- to Shs. 916/- per acre per annum. Muriate of potash and sulphate of ammonia also gave increases which more than paid for the cost of the fertilisers and their application. In addition to the *liberica* variety, *excelsa* and *robusta* coffee are under test; *excelsa* shows indications of being more vigorous and having certain other advantages over *liberica* even though it is usually considered to be a lower quality coffee. *Robusta* coffee, which has a wider market than either of the other two, does not appear to be so well suited to local conditions, but the plants are too young for a final judgment to be given.

Derris.—The market for derris root continued very firm, and the small production from the department's farms and a few private cultivators was easily disposed of. One particular consignment showed a rotenone content very much lower than usual, thus reducing the price payable; it is believed that this was due to much of the crop being over two and a half years old, which is usually considered to be the proper time for harvesting. An experiment to test this point, and to see whether there is much loss of yield if earlier harvesting is done is in operation. Also being tested are the manurial requirements of the crop. Rather more interest in

derris was shown by the public this year, particularly in Pemba, and the department's nurseries from which free issues of rooted cuttings are made were expanded to meet the expected demand. These nurseries are financed by the Clove Growers' Association.

Maize.—Work at Kizimbani amply demonstrated the advisability of manuring maize well. Yields were greatly increased and in one trial where a full application of farmyard manure and artificials was given the net profit resulting from the manures after deducting their costs and costs of application was nearly Shs. 100/- per acre. Varieties of maize bred by the East African Agriculture and Forestry Research Organisation for resistance to the rust *Puccinia polysora* were under test during the year.

Pepper.—Investigational work on black pepper at Kizimbani was expanded, plants being established under eight different shade trees and also in the open. The latter will be provided with non-living supports in due course and manurial trials are planned.

Pineapples.—Further trials of the fruiting hormone A.N.A. have shown that good fruits can be produced in advance of the normal season if the hormone is applied to well-grown plants, but that if poorly-grown plants are treated undersized fruits are produced and the plant suffers a severe set-back in its growth. In Pemba some 2,000 suckers were issued to schools and interested persons for planting.

Rice.—Mechanisation of rice growing is influenced by grower's ability to control weed growth and investigations on this problem were continued at Kizimbani. Weedkillers were found to be valueless in these particular conditions. The worst weeds are grasses and these are not affected by the hormone weed-killers while the rice itself is damaged if heavy dosages are used. Satisfactory weed control will depend on thorough cleaning of the land before planting and the use of a weeder afterwards; an implement for this purpose was under test and may be suitable provided conditions are satisfactory. Manurial and other trials with rice were continued both in Zanzibar and Pemba, and demonstrations of the use of artificial manures were given with success on private rice plots in a number of the main rice growing areas. Interest was shown in the demonstrations and the value of manures was in some areas well appreciated but a significant development of the use of manures by rice growers has not yet occurred.

Yams.—Demonstrations of the use of compost on yams were again made at the department's farms in the two main yam-growing areas of Zanzibar. As in previous years, expenditure on compost making and its application was well repaid. The yields of yams which had received compost were in some cases almost ten times those of yams which had been planted without compost. Planting material of three selected varieties was sold to the public.

Ylang ylang.—The regular harvesting of the trees planted at Kizimbani in 1949 continued and the trees which were planted in 1952 began to bear flowers. From the older plot, the weight of flowers picked was equivalent to 660.6 lb. per acre. The Clove Growers' Association again assisted the Department by carrying out experimental distillations and, from 397 lb. of flowers, 4.9 lb. of oil were obtained, equivalent to 8.12 lb. of oil per acre. These distillations emphasised the necessity for picking the flowers at the correct stage of development. An encouraging report was received on a sample of the oil sent to the Colonial Products Laboratory but enquiries within the trade indicated that small quantities are only of academic interest to the users of the oil and would not be easy to sell. The supply of large quantities however, is rendered difficult by the need for fractional distillation. For this reason a further six acres will be planted at Kizimbani in 1956 to bring the total area to about eight acres.

4. Mechanical Cultivation

For the 1955 rice crop two tractors in Zanzibar and one in Pemba* were available for the preparation of rice fields of the general public. In order to bring revenue more into line with costs an increase in charges from Shs. 48/40 to Shs. 60/50 per acre of ploughing was made but, to encourage consolidation of fields, the lower charge was made where any area available for ploughing in one piece exceeded five acres. The response to this offer was very poor and in fact almost all the ploughing undertaken was at the higher rate. Mention was made in the previous year's report of the rice growers' need for credit facilities when hiring mechanical cultivation, and arrangements were made for registered co-operative societies to have their rice land prepared by mechanical means on credit, payment to be made when the crop was harvested. The best single result in the Zanzibar rice areas was obtained where one such society took advantage of these facilities, but the subsequent collection of the debt has been a matter of some difficulty and may be expected to prejudice the society's approach to mechanical cultivation in the future.

To run the new Colonial Development and Welfare Rice Scheme originally approved in 1953 two officers were appointed in mid-1955 and the six Ferguson tractors purchased some months previously were then assembled. No attempt was made to offer credit facilities for the 1956 crop but consistent efforts were made to persuade rice growers to pay sums of money into the Post Office Savings Bank or to the Scheme well before the ploughing season was due to start in order to build up sufficient funds to meet the demand of "cash before cultivation". The appeal was reinforced by a general reduction in charges to Shs. 48/40 per acre for ploughing irrespective of the size of individual plots. The response was as good as was expected and from October, when the rice cultivation season began, there was sufficient work to keep all the tractors fully employed. Indeed, the difficulty has been to meet the demand, as the small size of the fields, weather and shortage of operators and spares have greatly

* Supervised by the district agricultural officers of the two islands

restricted the tractor output, A problem difficult of solution is that the majority of growers wish to have their fields prepared only in the month of December. They are unwilling to have this work done much earlier as subsequent weed growth may be excessive while later preparation may miss the optimum time for planting. By the end of the year some 520 acres of cultivation had been completed under the new scheme of which 322 acres was rice land ploughed for 432 growers. A further 150 to 200 acres may be cultivated before the rice season ends provided the weather is satisfactory. Bearing in mind the difficulties that may be expected to arise at the start of an organisation such as this, the amount of work done was not unsatisfactory, though it is realised that it must be improved upon in the future.

It is of interest to note that 169 tractor days were lost as compared with 245 days worked. Losses were mainly due to delays in obtaining spares following breakdowns and to excessive rain which made certain areas unworkable for prolonged periods. Some form of wheel extension or other method of distributing weight may be necessary if the tractors are to work after heavy rain. Excluding the costs of supervision, interest on capital and depreciation charges on workshop equipment, but including depreciation on machinery, the average cost of ploughing was Shs. 48/23 per acre and of disc harrowing Shs. 16/92 per acre. The average tractor hours worked per acre ploughed was 5.3. This high figure is a measure of the small size of individual plots cultivated and the distances between them. Consolidation of holdings or at least a more widespread acceptance of mechanical cultivation providing contiguous areas for ploughing would greatly improve the position. Stress will be laid on this aspect prior to the next rice season.

The Marden Weed Cutter mentioned in the 1954 report was tested in clove and coconut plantations and demonstrated to the public. There is no doubt that it is a very satisfactory implement for the destruction of heavy weed growth in plantations, but it remains to be seen whether it can be operated at a charge low enough to be attractive to those plantation owners who are able to obtain hand labour for this work.

Further trials at the Department's experiment station have demonstrated the practicability of sowing and weeding rice by mechanical means in Zanzibar.

5. Stock Husbandry.

Kizimbani Stock Farm.—On the first of January the herd totalled 259. During the ensuing twelve months seventy-eight calves were born, seventeen animals died, ten were sold and thirty-two were transferred to other sections of the department, giving a total of 275 head at the end of the year. An analysis of calvings over past years showed that significantly more calves are born in April and May than in other months, and significantly fewer during the period from November to February. As is usual, the majority of deaths occurred at the end of the long rains, in May and June; a third of the total deaths were due to East Coast Fever. The herd was dipped at five-day intervals, except for a period of a month when seven-day dipping

was introduced and found to permit outbreaks of East Coast Fever. The source of infection is probably undipped privately owned cattle which sometimes graze on Government land. Mortality in calves up to one year old was 8.9 per cent which is not an unsatisfactory figure.

The system of management of the herd was little changed. The majority of the calves were bucket fed on whole and skimmed milk and weaned at 150 lb., and the cows fed on a ration of cassava, coconut cake, maize meal and bran while being milked. A new departure was the use of a limited number of the best culled cows as nurse cows each of which could rear two or three calves in a lactation. The culling standard, which was raised in 1954 from 2,000 lb. to 2,250 lb. of milk in 305 days in either the first or second lactation, was raised again in 1955 to 2,600 lb.

It is very gratifying to be able to record that once again the milk index (pounds of milk per cow-in-milk per day) rose in comparison with the previous year's figure, and now stands at 9.0 while in 1942 it was 4.2. Other production indices also rose, the average output of milk per cow for the year being 2,433 lb. as compared with 2,294 lb. in 1954, and the average yield per lactation of 305 days for the seventy-two lactations which were completed during the year rising from 2,174 lb. to 2,349 lb. Shs. 28,342/- were received from sales of dairy products other than cattle.

Bull No. 399, named "Ndurumo", which was imported from Kenya, has now been fully tested through his daughters and is proved to be of very great value to the herd. Eighty-two per cent of his daughters in their first lactations exceeded the first lactations of their dams, while fifty-three per cent exceeded in their first lactations the best lactations of their dams which had completed an average of over six lactations. It would now be policy to use this bull as much as possible, but unfortunately he has become almost blind and there may be a short service life remaining to him.

The bull scheme by which selected bulls bred at Kizimbani are placed at stud in the districts made poor progress owing to the lack of interest shown by the public. Large mature bulls would be more attractive to cattle owners but most of the Kizimbani bulls were two to three years old and had not reached their full development.

Pasture Improvement.—At Kizimbani a replicated trial was laid down to compare six fodder species, *Digitaria sp.*, *Pennisetum purpureum*, *Panicum maximum*, *Melinis minutiflora*, *Pueraria phaseoloides* and *Stylosanthes gracilis*, and additional half-acre extension plots were planted of each. The produce is cut and fed green. *Digitaria* was the easiest to establish and grew well. *Melinis* was somewhat difficult to establish but produced luxuriant foliage which retained its succulence in the dry weather. *Pueraria phaseoloides*, the tropical kudzu, remained the principal fodder used on the farm and is of inestimable value particularly in the dry season. Elephant grass planted in 1954 was also used, but the plot quickly deteriorated. Although elephant grass produces a good weight of fodder a major disadvantage is that only fresh growth is palatable, necessitating cutting at appropriate intervals, whereas kudzu forms a reserve of green food which may be cut and fed at any time.

Digitaria continues to prove itself a most useful pasture grass, and a previous observation that it was of relatively short duration may be modified in that under conditions of controlled grazing it is still growing well after five years. It is highly palatable and milk yields invariably rise when the milking herd is turned on to *Digitaria* pasture. Although it is not repressive of weeds it withstands hormone weedkillers and these are now used as a matter of routine. It responds well to nitrogenous manuring as indicated by the preliminary results in a small trial where sulphate of ammonia at 1½ cwt. per acre gave a fifty per cent increase in fodder at five weeks after application, equivalent to two tons per acre costing Shs. 19/- per ton. It is not, however, so suitable as Pemba grass, *Stenotaphrum dimidiatum*, for paddocks where heavy rates of stocking are expected, but Pemba grass requires a higher level of soil fertility and is not so tolerant of dry conditions.

Maize silage made in a pit in 1954 was at first refused by the herd but was eaten during the dry months and quickly became very popular. There was very little wastage in the pit, 4.6 tons of green material giving 1.1 tons of silage all of which was acceptable.

Cattle Industry in the Uwanda Areas.—The success of the ranching scheme at Hanyegwa Mchana has resulted in the establishment of a second herd in a large area of some 3,000 acres of previously unused land at Tunguu. At Hanyegwa the herd had expanded to 371 head by the end of the year. Losses to the herd consisted of seven deaths, twenty young stock transferred to Tunguu, five old, barren or blind cows sold for slaughter and thirty-two fat bullocks averaging 618 lb. liveweight also sold for slaughter. Additions were thirty-nine animals brought in from Kizimbani and sixty-five calves born.

For starting the Tunguu herd 109 young heifers were purchased from Pemba and quickly settled down to their new environment. By the end of the year the herd consisted of 163 animals. In both herds condition has been well maintained throughout the year, the young stock in particular looking very healthy. At Hanyegwa, however, older cows suckling calves tend to lose condition rather badly in the dry weather, and a policy of separating them from the main herd for paddock grazing is being followed when necessary.

At Hanyegwa the cattle are dipped regularly and the ranch thus provides a suitable place to which culled cows and bullocks may be sent from the Kizimbani herd. At Tunguu, on the other hand, the cattle are, only being sprayed and it is expected that they will contract mild attacks of East Coast Fever. If they do it would be possible in the future to dispose of female stock for breeding to cattle owners in areas where dipping is not practised.

Trypanosomiasis has not been serious at either ranch although both are adjacent to tsetse fly areas, and the few cases that have occurred have been successfully treated. This very satisfactory position is the result of the attention to bush clearing which has been given.

Tsetse and Trypanosomiasis Scheme.—No new work was undertaken in connection with the survey and the scheme has been merged with the new Tunguu ranching scheme. Recording of the incidence of trypanosomiasis in the experimental areas Pongwe and Binguni was terminated in August. The records continued to show a low incidence of the disease in the area cleared in early 1954 (Pongwe), and a steady rate of infection in the uncleared area (Binguni) throughout the period. However, in the months of July and August, seventeen months after the clearing was done, the infection rate in the cleared area had considerably increased and it seems certain that re-growth of bush has been sufficient to permit flies to shelter there after migration even if they do not breed there. In the original survey at Mwera, cleared in 1952-53, pupal search has continued but no live pupae have been found and it is evident that the area has not been re-invaded. Clearing of the bush in a southerly direction from Tunguu towards the sea could not be continued with the funds available as re-growth in the centre of the Tunguu ranch required further attention.

Disease Control.—Dipping against East Coast Fever remained unacceptable to the majority of the cattle-owning public, other than the commercial dairymen who supply Zanzibar town with milk largely from grade cattle. But in Pemba one of the three dips continued to be used with reasonable regularity, though fewer cattle passed through it than in the preceding year. In another area where cattle owners had been determinedly against dipping for some years the posting of an energetic member of the veterinary staff to the district resulted in a number of cattle being brought. Where facilities for spraying cattle have been provided there has been a considerable response particularly in Pemba, although at Makunduchi in Zanzibar, where spraying was first done, attendance has declined during the year. Although spraying has certain advantages over dipping, for large scale control of ticks it is more expensive and could not be contemplated as a Protectorate-wide free service by the department. In Zanzibar the numbers of privately owned cattle passing through the five dips other than Kizimbani totalled 68,646 as compared with 76,830 in 1954, while 12,880 cattle were sprayed at six centres as compared with 1,307 at three centres in the preceding year. In Pemba, 2,291 privately owned cattle passed through the three dips, as compared with 2,957 in 1954, and 1,901 cattle were sprayed at thirteen centres during the last three months of the year. A dog dip was constructed at Wete and eighty-eight animals were dipped in November and December.

Clinical treatment of sick animals was on much the same scale as in 1954, 5,588 cases being treated in Zanzibar and 3,138 in Pemba. In cattle, trypanosomiasis accounted for 1,246 of the cases in Zanzibar and the next most numerous complaints were helminthiasis, wounds, constipation, conjunctivities and babesiosis. For the last disease mentioned 161 animals were treated. In Pemba cattle the most common complaints were wounds and ulcers for which 298 animals were treated, while conjunctivitis and ophthalmia accounted for 167 and 165 cases respectively. In Zanzibar 9,556 specimens were examined for morbidity.

6. Forestry.

No new forest projects were undertaken in 1955 but valuable work was done in consolidating the activities of recent years, in advancing afforestation, in preparing for the exploitation of an area of high forest and in the enactment of legislation.

The mangrove areas of Pemba and Zanzibar, occupying some 40,000 acres of shoreline in the numerous bays and inlets, were the subject of special attention. In Zanzibar the mangrove forests of Kisakasaka and of Kinani in Chwaka Bay were by legislation closed to all cutting in order to allow regeneration to take place. At Chwaka the closure was in accordance with an agreement made with the local people two years ago, but at the time not strictly enforced. Now that the agreed arrangements are being carried out, however, the people find themselves less ready to accept them or to appreciate their value. Under this plan one section of the extensive mangrove area in the bay will be exploited while two others are regenerating under such limited cutting as may be required to allow for growth of the more valuable species. In Pemba also mangrove forests were closed to cutting at Kojani, Micheweni and part of Shengejuu in the north-east of the island and at Matumbili island in the south, to allow some areas to regenerate while others are being exploited. To enable protection of these forests to be enforced, all the principal areas in Zanzibar and the areas on the northern and eastern coasts of Pemba have been demarcated with concrete beacons.

Legislation was also enacted constituting four Forest Reserves in Zanzibar amounting in all to 1,385 acres. In these reserves, situated at Kichwele, Pangeni, Pangeni Kwa Wakoma and Walezo Chumbuni on Government plantations largely devoid of economic tree crops, afforestation projects are already being carried out. Other areas which remain to be so constituted and which are also being afforested are still the subject of investigation in regard to boundaries and private claims. Newly enacted Forest Reserves Rules define the conditions under which a Forest Reserve may be exploited.

Afforestation progressed in all the projects which were in being. At Kichwele-Pangeni which is maintained by prison labour, some 24,000 casuarina and eucalyptus seedlings were planted in forty-eight acres of new planting in the *masika* and *mivule* (*Chlorophora excelsa*) were planted in the *vuli*. This area has now had planted in it some 214,000 trees of twelve different species of which *Eucalyptus rostrata* and *Casuarina equisetifolia* predominate. *Acacia auriculiformis* has also been planted in considerable numbers. Teak (*Tectona grandis*), *Dalbergia sissoo*, *Albizzia moluccana*, *Azadirachta indica* (neem), *Sorindeia Madagascarensis* and *Pinus pinea* have not been successful in the area. At Dunga, on the *uwanda* soil, some 236 acres were planted, inclusive of eighty acres of 1954 planting destroyed by fire, using 99,422 eucalyptus 4,166 casuarina and 3,760 *mvule* stumps. In addition *Pterocarpus indicus* (Bloodwood) was planted along fire traces and some 39,000 eucalyptus and casuarina were planted in areas which failed in 1954. At Jendele, on soil somewhat similar to that at Dunga, 6,000

eucalyptus and casuarina were used for replanting gaps, but no extension of the planted area was undertaken, while at Walezo-Chumbuni 5,000 casuarina seedlings were used for gapping. At Masingini where afforestation is being undertaken as part of a scheme to conserve the Zanzibar town water supply, the planted area was extended by planting 100 *mtondoo* (*Calophyllum inophyllum*) and 500 *mwavi* (*Erythrophleum guineense*) in the valley bottoms, and gapping was also done with casuarina, *Peltophorum ferrugineum* and neem. The *mwavi* failed completely, and the *mtondoo* made poor progress but *Peltophorum* has done well, as have some of the neem and casuarina.

It has become abundantly clear that success in afforestation under the conditions prevailing at the foregoing areas depends to a very large extent on the provision of pits of a size sufficient to enable the seedlings to make rapid root growth with thorough cultivation during the first few years after planting. The former is not easy of attainment with labour which finds the digging of holes irksome and laborious and is constantly desirous of decreasing the standard task set for a day's work. Fire continues to be a serious hazard particularly in the *uwanda* areas and the maintenance of adequate fire-breaks at a reasonable cost is a problem which has not yet been solved.

Afforestation was also undertaken in the Protectorate's two main areas of natural forest. At Jozani in Zanzibar island 5,100 seedlings of *Calophyllum inophyllum* (*mtondoo* or Alexandrian laurel) which is indigenous to the forest and 500 eucalyptus were planted, the latter in the low-lying areas which flood during the main rains. The eucalyptus have made growth of fifteen feet in two years while the *mtondoo* are growing at the rate of about two feet per year. This planting is being done in order to re-stock the forest with useful timber trees, most of the vegetation now consisting largely of *Pandanus*, *Raphia*, *Elaeis*, *Phœnix*, *Ficus* and other valueless species. The destruction of certain of these species by poisoning is being tested. At Ngezi forest in Pemba where *Chlorophora excelsa* (*mvule*) grows wild in small numbers, planting of this species continued. Some 1,030 mvule stumps were planted in thirty-one acres of new area, and 849 were used for replacing deaths in previous plantings.

Appreciation of the value of forest tree planting is spreading and with the active help of the Administration a number of small village forests were started in the south and east of Zanzibar island, the villagers themselves undertaking the work without payment. Tree Planting Day was celebrated at Zanzibar town's civic centre on 14th April when symbolic trees were planted and free issues of fruit trees made to the public throughout the island.

Active exploitation of forest products consisted of the cutting under licence of mangrove poles for building purposes, a trade of long standing, and the working by a concessionaire of Jozani forest for *mtondoo* and *mfuu* (*Vitex cuneata*). 6,400 cubic feet of the former were extracted and 1,200 cubic feet of the latter. Most of the *mtondoo*, a hard wood, was

exported to the United Kingdom as round timber while some was sent to South Africa for parquet flooring. The *Vitex* is used in East Africa for box making. Preparations were made for the working of Ngezi forest, including the demarcation of felling coupes with concrete beacons and the marking of trees to be felled. A tender for the exploitation of the forest was accepted towards the end of the year.

7. Fisheries

Since the Fisheries Scheme came into being in 1949, the most important work of the Fisheries Officer has consisted in investigating the fishing grounds of Zanzibar and Pemba and testing fishing methods and gear which could be used with powered craft. The investigations have shown that small powered craft provided with suitable equipment can be used economically and profitably and a number of people interested in fishing have become anxious to purchase and operate such boats.

In 1955 an important step forward in the development of the industry was the establishment of a revolving fund having an initial provision of £6,500 to be used for the purchase of powered fishing boats for re-sale to fishermen on assisted terms with certain safeguards relating to methods of fishing and use of the vessels. Under this scheme two boats had passed into private ownership by the end of the year while four more had been ordered. A similar vessel purchased privately in 1944 was also in operation. These boats are twenty-two feet in length by seven feet six inches beam by three feet three inches draft and are powered by a 9/11 h.p. single cylinder two cycle semi-diesel engine with a power take-off and capstan. The simplicity of this engine is considered to be of special importance. They are being sold for £1,100 complete with trolling poles and fishing gear.

To obtain an economic return the vessels must be used to their full capacity and are therefore equipped to engage in shark fishing and trolling with multiple lines and artificial lures. Shark fishing appears to be particularly open to development in these waters, shark meat being valued highly both in its fresh and dried state, while a market also exists for shark liver oil and shark fins.

8. Education

At Kizimbani five pupils in training undertook the first year of a two-year course which is intended to train men to become field officers in the agricultural or veterinary sections of the department. Two rural school teachers also attended this first year of the course.

Schools were visited by district staff and advice was given on the running of school gardens. The District Agricultural Officer, Zanzibar, judged the annual school garden competition in company with the District Education Officer.

Fortnightly radio broadcasts were given on a variety of agricultural matters of both a technical and general nature and included interviews with farmers. The majority of these broadcasts are published in the Government weekly paper *Maarifa* and also printed as handbills for distribution by the district staff. Talks were also given by field staff in the intervals between films when the mobile cinemas visited suitable country areas. The department continued to issue a quarterly bulletin in English which provided interesting and useful up-to-date information on various agricultural topics. Extracts from this bulletin are often reproduced in the better local newspapers.

A successful agricultural show was held at Wete in September at which most aspects of the department's extension and development work were demonstrated. Other departments of Government also had exhibits as did the Clove Growers' Association.

At the end of 1955 a new method of giving agricultural instruction was commenced. A local man, trained at Makerere and later at Seale Hayne in England is now giving lectures and practical instruction in four villages to a limited number of men selected from those who appeared to be most interested. Lectures and talks are given to the men in the afternoons or evenings, and these are often attended by outside people. In the mornings the Field Officer visits the villagers' own fields where he gives practical advice and organises demonstrations. At present he stays in each village for two weeks, before moving on to the next. Various subjects are dealt with according to the district but they include the growing of food and cash crops, varieties to grow, composting and manuring, artificial fertilizers, the feeding of stock, tick control, tsetse control and general stock management.

It is too early to say what the effects of this work will be, but the method certainly ensures that instruction is given to industrious persons who have already taken up agriculture as an occupation. Many of the men appear to be genuinely interested and people in other villages have asked for attention to be paid to them.

9. Distribution of Planting Material

The Department continued to produce for the public planting material of the principal and minor cash crops, a number of improved food crops, a wide selection of fruits and some forest trees and ornamentals. A list of the planting material sold or distributed free is shown in Appendix II. Clove seedlings were raised in nurseries financed from grants made by the Clove Growers' Association and from Protectorate funds, while coconut seedlings were produced under grants from the Copra Board. The Clove Growers' Association also provided funds to raise planting material of cacao, derris, chillies and coffee. Citrus and mango plants were produced and distributed under a Colonial Development and Welfare Scheme.

10. Government Plantations

The 1955-56 clove crop on the Government Plantations was again poor producing no more than 326 frasilas to the end of December with a reliable estimate of not more than 580 frasilas for the whole season. The coconut crop was satisfactory, being the largest since 1950 but a drop in the price of copra affected the financial position adversely. Taking all factors into account the plantation showed a loss for the second year in succession, the amount being approximately £4,025. One of the four plantations, Mtoni, showed an individual profit. Profits earned in 1952 and 1953 amounted to £8,559 and £12,013 respectively. The change in the financial position is due, not to any large increase in expenditure, but to the fall in the price of cloves and the small crops harvested.

As is customary the clove crop was sold through the Clove Growers' Association as it became available, a proportion being bought by the Association when the market price dropped to the Association's guaranteed price. All coconuts gathered were made into copra with the exception of those used for seed on the plantations or sold to the Copra Board for the same purpose, and all copra was sold on the local market by the Clove Growers' Association. The Government plantation copra, which is all prepared on kilns, has a good reputation in the local market and invariably commands a premium of two per cent or more.

The following tables show the year's harvests for cloves and coconuts compared with previous year's revised figures:—

Cloves

Season	*Green cloves lb.*	*Dry cloves lb.*	*Dry stems lb.*	*Average price cloves per 100 lb. Shs.*
*1955—1956	34,534	11,414	3,488	198.50
1954—1955	40,480	12,824	3,290	198.83
1953—1954	336,078	105,032	32,903	223.36
1952—1953	103,093	35,082	11,010	763.31

*to December, 31st 1955 only.

Coconuts

Year	*Nuts gathered*	*Copra made tons*	*Nuts per ton of copra*	*Average copra price Shs. per 100 lb.*
1955	2,551,926	306	6,945	40.60
1954	1,890,341	266	7,040	54.25
1953	2,236,074	270	7,282	57.73
1952	2,454,853	339	6,542	36.31

A total of 9,906 clove seedlings were planted of which 3,864 were for new areas and the remainder for gapping. Most of these seedlings were planted in pairs. Control of clove die-back disease through pruning continued and cost Shs. 2/74 per tree. Only 702 coconut seedlings were planted while 341 trees were lost through deaths, sea erosion and fellings to clear land for building or other purposes. Re-planting in two plantations, which is needed, is precluded by the intensive grazing of non-Government cattle which takes place there. Two new areas amounting to approximately 2½ acres were planted with

forastero cacao seedlings, while 189 *forastero* cuttings and 58 *criollo* cuttings were planted in about half an acre. Some 4,700 *forastero* seedlings were used for supplying gaps in all existing plantations. As in previous years the plantations section harvested and fermented without charge cacao belonging to private individuals: the prepared cacao beans were bulked with the produce of the Government plantations and offered for sale in the United Kingdom through the Clove Growers' Association; the proceeds will be paid to each grower in proportion to his crop. Pineapple culture ceased in 1954 but 4½ acres of derris were planted. At the end of the year the plantations section took over from the Citrus Scheme the twenty acre citrus plot at Dole. 445 tons of compost were made and sold at Shs. 5.00 per ton up to June and Shs. 7.50 thereafter, the cost of production being approximately Shs. 10.40 per ton.

11. Produce Inspection

Inspection of produce is carried out by a section of the Department operating under the Agricultural Produce Export Decree and under the Adulteration of Produce Decree. Certain produce although not scheduled is inspected and reported upon prior to export at the request of the exporters. It is of interest that December 1955 completes the thirtieth year of clove inspection and the twentieth year of copra inspection.

One hundred and seventy-eight thousand bales of cloves of 140 lb. each involving 2,000 consignments were inspected and graded prior to export as compared with 157,000 in 1954 and 132,000 in 1953. The examination of the increased number of bales was facilitated by the system of making smaller bulks which was introduced towards the end of 1954 and has now proved itself.

The amount of copra examined and passed for export, at 5,588 tons, was only slightly less than that of the two preceding years, and of this twenty-five tons was graded F.M.S. and the remainder F.M. This division, however, does not perhaps reflect the improvement in the quality of the copra now being exported, which as a result of the attention paid to it by the inspectorate staff and the shippers is now acceptable in the more discriminating markets. The thorough inspection of coconut oil prior to export was continued and samples of oil from every drum of the 22,000 exported were first examined visually and then partly bulked for analysis.

Other produce examined prior to export included forty-nine tons of chillies and bags of whole coconuts consigned chiefly to Port Said.

Under the Adulteration of Produce Decree all cloves, clove stems and copra offered on the Zanzibar market and all cloves and copra sent from Pemba to Zanzibar were inspected. Of the Zanzibar cloves ten per cent were failed on inspection, while 5½ per cent of the Pemba cloves, which were inspected in Pemba prior to shipment to Zanzibar, were also failed on arrival. The weighted average figure of six per cent shows an improvement on 1954 (ten per cent) and 1953 (eight per cent). With copra and clove stems also there was a reduction in the percentage failed as compared with 1954, copra dropping from three per cent to 0.8 per cent

and clove stems from three per cent to 1.5 per cent. Quantities inspected under the Adulteration of Produce Decree are shown in the following table:—

Produce and Origin	*Deliveries (bags)*	*Passed (bags)*	*Failed*		*Percentage of failures*
			Excessive moisture (bags)	*Extraneous matter (bags)*	
Zanzibar cloves ...	40,314	36,264	3,714	336	10
Pemba cloves	251,124	237,249	13,688	187	5½
Total cloves ...	291,438	273,513	17,402	523	6
Zanzibar clove stems ...	11,224	11,047	61	116	1½
Pemba clove stems* ...	72,785	69,694	592	2,499	4
Total clove stems ...	84,009	80,741	653	2,615	4
Zanzibar copra	183,995	182,459	1,463	73	1
Pemba copra	64,801	64,350	–	451	1
Total copra ...	248,796	246,809	1,463	524	1

*Not re-examined in Zanzibar.

12. Chemical Laboratory

As in the past few years, in the absence of a Government Chemist the main work of the chemical section has been routine analysis of samples for Government departments and for the public. Reports were made upon 1,821 samples of which 1,783 were from departments and thirty-eight from private sources. Of the former the majority were for the Department of Agriculture and included coconut oil, clove oil, cloves, copra and seaweed destined for export, and veterinary specimens for the Veterinary Section. Of these, coconut oil and dip fluid predominated. For the Health Department samples of milk were tested and thirty-one per cent found to be below standard, while specimens of medical significance were also examined. Nearly 200 samples of water were tested for the Water Authority and various police exhibits were reported upon. The majority of the analysis undertaken for the public were of coconut oil and copra cake for export.

Assistance was given to the Clove Growers' Association in the preparation of samples of lime juice, lime oil and ylang ylang oil in order to determine their value on the English and other markets. Some ylang ylang flowers grown by the Department of Agriculture were also distilled for oil in the laboratory and poison baits for pigs were prepared for the Administration.

In August an appointment was made to the post of Government Chemist which had been vacant for five years and consideration was given to work on soil fertility. A preliminary trial of ammonium molybdenate on grassland in connection with a possible molybdenum deficiency gave negative results.

13. Principal Agricultural Legislation

The following is a list of the more important agricultural legislation promulgated during the year:—

Decree No. 14 ...	Agricultural Returns Decree (Repeal) Decree ... ... Repeals the obsolete Agricultural Returns Decree requiring occupiers of agricultural land to submit annual returns	9.7.55
Decree No. 19 ...	Agricultural Produce Export (Amendment and Repeal) Decree. Enables rent to be charged when copra is stored by merchants on Government premises after inspection prior to export.	10.9.55
Government Notices Nos. 10, 89 and 129	The Clove (Minimum Percentage of Exported Cloves) Orders. Require that for every 100-lb. of cloves exported the amount to be purchased from the Clove Growers' Association shall be 10 lb., 25 lb. and 50 lb. as from 1st March, 1955, 1st October, 1955 and 1st January, 1956 respectively.	25.1.55 26.7.55 1.11.55
Government Notice No. 19.	The Exports Control (Prohibited Exports) Order. ... Prohibits the export except under licence of charcoal, firewood, lime, mangrove poles, fresh fruit and vegetables and certain other non-agricultural articles.	17.2.55
Government Notice No. 111.	The Agricultural Produce Export (Copra) (Amendment) Rules. Fix rental charges for storage of copra at inspection sheds and vary inspection procedure.	6.10.55
Government Notice No. 136.	The Labour (Forms of Contract) (Amendment) Regulations. Provide for a form of contract for the weeding of plantations.	22.11.55
Government Notices Nos. 143 and 144	Defence (Land Requisition and Personal Service) (Rice Planting) Orders. Provide for the compulsory planting and cultivation of rice.	3.12.55
Government Notices Nos. 28, 19, 30 and 31.	Forest Reserve Constitution Orders ... ... Constitute and define four forest reserves in Zanzibar Island.	9.3.55
Government Notice No. 59.	Declaration of Reserved Areas under the Woodcutting Decree. Prohibits the cutting of wood in certain mangrove forests in Zanzibar Island.	3.5.55
Government Notice No. 60.	The Forest Reserves Rules ... ... Govern the exploitation of forests, providing for contracts, marking, felling, depasturing of animals and other relevant matters.	7.5.55
Government Notice No. 26.	Establishment of Quarantine Station under the Animal Diseases Decree. Establishes a second quarantine station in Zanzibar Island.	1.3.55
Government Notice No. 61.	The Animal Disease (Amendment) Regulations ... ... Provide for the landing of animals imported by air, include quarantine stations not previously covered by the Regulations and provide for the movement of animals between Zanzibar and Pemba.	7.5.55
Government Notice No. 142.	The Animal Diseases (Importation of Carcases) (Prohibition Restriction) Regulations. Give the Director of Agriculture power to prohibit or restrict the importation of carcases for the purpose of preventing the outbreak or spread of disease.	22.11.55

11th February, 1956

A. K. BRIANT,
Director of Agriculture

Appendix I

STATEMENT OF REVENUE AND EXPENDITURE OF THE GOVERNMENT PLANTATIONS

Revenue to the Nearest £.

	Kidichi	*Selem*	*Mtoni*	*Chukwani*	*Jendele*	*Total*
	£	£	£	£	£	£
Clove and stems	9,352	1,421	66	4	774	11,617
Copra	7,617	1,425	3,011	1,631	–	13,684
Coconuts	151	58	177	255	–	641
Coconut crops	–	12	189	110	50	361
Miscellaneous	94	24	215	19	8	360
Leased plantations	–	60	–	–	–	60
Hire of lorry	46	9	17	11	1	84
Rent of quarters	19	4	6	6	–	35
Total ...	17,279	3,013	3,681	2,036	833	26,842
Deduct value of produce brought forward	8,742	1,242	53	69	581	10,687
Balance ...	8,537	1,771	3,628	1,967	252	16,155
Add value of produce carried forward	1,380	57	155	383	–	1,975
Total ...	9,917	1,828	3,783	2,350	252	18,130

Expenditure to the Nearest £.

	Kidichi	*Selem*	*Mtoni*	*Chukwani*	*Jendele*	*Total*
	£	£	£	£	£	£
Personal Emoluments:						
Headquarters staff	1,015	245	337	240	24	1,861
Field staff	1,499	397	420	187	–	2,503
Total Personal Emolument. ...	2,514	642	757	427	24	4,364
Other Charges:						
Transport and travelling ...	98	44	25	26	1	194
Material and tools	59	13	18	15	–	105
Labour	8,884	2,529	2,524	2,287	240	16,464
Repairs to buildings	259	309	37	65	–	670
Fuel and maintenance of vehicles	188	35	99	51	4	377
Hire of tractor	100	–	–	–	–	100
Total Other Charges. ...	9,588	2,930	2,703	2,444	245	17,910
Grand Total ...	12,102	3,572	3,460	2,871	269	22,274
Deduct arrears of salary 1954 ...	64	10	35	10	–	119
Grand Net Total ...	12,038	3,562	3,425	2,861	269	22,155
Profit	–	–	358	–	–	–
Loss	2,121	1,733	–	511	18	4,025

Appendix II

DISTRIBUTION OF PLANTING MATERIAL

Planting material of food-crops are usually distributed free, plants of permanent economic crops are normally sold.

Avocado pear, grafted	Nos.	13
,, ,, seedlings	,,	16
Banana, suckers	,,	507
Breadfruit, rooted cuttings	,,	50
Cacao, seedlings	,,	4,770
Cassava, cuttings	,,	89,700
Casuarina, seedlings	,,	6,650
Chillie, seed	lb.	19
,, seedlings	Nos.	660,982
Cinnamon, seedlings	,,	30
Clove, seedlings	,,	385,244
Coconut, seedlings	,,	139,401
Coffee, seedlings	,,	12,437
Cowpea, seed	lb.	18
Derris, rooted cuttings	Nos.	17,132
Durian, seedlings	,,	359
Eugenia javanica, seedlings	,,	4
E. malaccensis, seedlings	,,	77
E. uniflora, seedlings	,,	2
Gram, green, seed	lb.	17
Grapefruit, budded	Nos.	412
Groundnuts, seed	lb.	218
Guava, Chinese, seedlings	Nos.	92
Jackfruit, seedlings	,,	237
Kapok, seedlings	,,	2,910
Lime, budded	,,	15,928
,, seedlings	,,	529
,, sweet, seedlings	,,	22
Litchi, marcotts	,,	140
Madras thorn, seed	lb.	25
Madras, thorn, seedlings	Nos.	1,000
Maize, seed	lb.	319
Mandarins, budded	Nos.	2,129
,, seedlings	,,	174
Mango, grafted	,,	459
Nutmeg, seedlings	,,	101
Orange, budded	,,	7,698
Pawpaw, seedlings	,,	100
Pepper, black, rooted cuttings	,,	438
Pineapple, suckers	,,	2,150
Pomegranate, seedlings	,,	12
Pomelo, budded	,,	15
Rambutan, seedlings	,,	1,310
Rice, seed	lb.	1,610
Sapodilla, marcotts	Nos.	4
,, seedlings	,,	12
Sorghum millet, seed	lb.	239
Soursop, seedlings	Nos.	39
Star apple, seedlings	,,	30
Sweet potatoes, vines	,,	60,300
Tannia, tuber sets	,,	2,000
Yams (Dioscorea) tubers	lb.	6,363

Appendix III

DOMESTIC EXPORTS, 1955

Items	*Unit of Quantity*	*Quantity*	*Value*	*Percentage of Total value*
			£	
Cloves	Cental of 100 lb.	251,910	3,957,398	79.86
Clove bud and stem oil	lb.	191,211	106,844	2.15
Copra	ton.	5,406	325,215	6.56
Coconuts	cwt.	22,971	35,165	0.71
Oil cake	,,	61,172	69,203	1.40
Soap, common and toilet	,,	88	295	—
Coconut oil	,,	74,204	333,692	6.74
Chillies	,,	981	15,116	0.30
Fruit, fresh	,,	5,628	5,802	0.12
Beche-de-mer	,,	148	1,520	0.03
Tobacco, unmanufactured	lb.	92,712	4,336	0.09
Ox hides	cwt.	737	6,398	0.13
Skins, sheep and goat	,,	218	2,196	0.05
Livestock	No.	3	12	—
Forest products	value	–	997	0.02
Kapok	cwt.	468	6,085	0.12
Fibres, manufactured	ton.	54	4,261	0.08
Shells, marine	cwt.	6,606	26,134	0.52
Fish, dried or salted	,,	66	1,161	0.03
Fish, fresh	,,	1	6	—
Lime	,,	3,729	1,165	0.03
Seaweed	ton.	221	10,750	0.22
Other articles	,,	–	41,385	0.84
	Total		4,955,136	100.00

Appendix IV

APPROXIMATE PRODUCTION OF CLOVES IN FRASILA OF 35 lb. FOR THIRTY-FIVE CROP YEARS

(1st July to 30th June)

(Based on receipts of cloves at the Central Market and C.G.A.)

Season	*Zanzibar Frasila*	*Pemba Frasila*	*Total Frasila*	*Mean crop per season in 5-year periods Frasila*
1920/21	231,831	316,446	548,277	—
1921/22	65,819	200,983	266,802	—
1922/23	291,417	690,498	981,915	576,809
1923/24	75,027	236,767	311,794	474,267
1924/25	240,952	520,490	761,442	574,046
1925/26	219,192	392,622	611,814	586,753
1926/27	203,843	529,186	733,029	679,998
1927/28	190,370	500,382	690,752	621,766
1928/29	74,828	125,740	200,568	599,521
1929/30	318,647	610,296	928,943	633,021
1930/31	51,796	201,320	253,116	561,281
1931/32	175,070	760,786	935,856	601,847
1932/33	242,772	244,594	487,366	561,170
1933/34	146,098	781,090	927,188	706,494
1934/35	360,037	503,415	863,452	693,395
1935/36	65,938	232,571	298,509	702,474
1936/37	45,096	351,568	396,664	592,636
1937/38	446,500	909,416	1,355,916	768,346
1938/39	39,879	115,211	155,090	613,926
1939/40	168,041	501,474	669,515	575,139
1940/41	146,323	575,277	721,600	659,757
1941/42	297,578	889,550	1,187,128	817,850
1942/43	40,049	223,691	263,740	599,414
1943/44	263,423	777,218	1,040,641	776,525
1944/45	200,417	459,396	659,813	774,584
1945/46	26,493	161,075	187,568	667,778
1946/47	170,280	924,329	1,094,609	649,074
1947/48	30,914	280,986	311,900	658,906
1948/49	81,700	310,971	392,671	549,312
1949/50	153,888	430,253	584,141	514,178
1950/51	158,588	1,081,786	1,240,374	724,739
1951/52	45,892	290,007	335,899	572,977
1952/53	91,417	82,328	173,745	545,366
1953/54	179,883	1,101,302	1,281,185	723,069
1954/55	97,944	448,927	546,871	715,615
Average for 35 seasons	161,084	478,912	639,996	—

		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total 1955	Total 1954
Kigomasha ...	Rainfall in ins. ...	0.62	3.40	5.10	11.00	21.09	8.66	3.50	1.22	1.40	1.76	3.56	0.66	61.97	70.39
	No. of wet days ...	5	4	6	19	28	19	12	7	9	11	9	7	136	130
Matangatwani ...	Rainfall in ins. ...	2.47	3.76	0.47	13.33	22.43	7.64	4.27	0.38	0.31	2.20	5.53	2.21	65.00	59.04
	No. of wet days ...	5	3	4	23	31	23	16	5	6	11	15	12	154	127
Wete	Rainfall in ins. ...	6.45	1.96	0.67	18.17	26.51	7.61	2.72	0.28	0.20	2.90	7.45	3.68	78.60	73.62
	No. of wet days ...	4	3	3	21	29	15	10	3	1	5	15	9	118	129
Mkoani	Rainfall in ins. ...	2.63	3.68	2.89	21.67	36.08	11.26	2.48	0.69	–	1.21	8.05	1.78	92.42	85.60
	No. of wet days ...	5	5	4	20	27	19	11	4	–	3	11	6	115	99
Mkokotoni ...	Rainfall in ins. ...	2.60	1.34	2.56	13.23	15.95	4.05	2.60	0.50	1.43	2.33	6.11	1.23	53.93	54.77
	No. of wet days ...	4	3	2	14	26	6	9	2	7	7	9	7	96	82
Mtambile	Rainfall in ins. ...	6.53	3.84	9.55	23.03	38.59	8.61	3.55	0.33	0.25	1.59	8.44	5.84	110.15	89.85
	No. of wet days ...	19	6	9	23	31	26	17	4	7	7	15	18	182	150
Wesha	Rainfall in ins. ...	2.50	1.66	6.00	14.72	31.31	9.89	3.35	0.75	0.12	0.87	6.89	9.20	87.26	63.05
	No. of wet days ...	11	4	5	21	31	25	16	4	2	4	12	15	150	143
Mkwajuni	Rainfall in ins. ...	1.70	2.11	2.12	10.37	15.41	5.00	2.76	1.39	2.29	0.85	8.70	4.35	57.05	47.34
	No. of wet days ...	7	4	3	21	29	19	16	10	11	6	16	10	152	100
Limbani	Rainfall in ins. ...	4.08	2.35	1.85	13.88	26.36	8.69	3.42	0.05	0.39	1.34	7.35	5.69	75.45	77.29
	No. of wet days ...	11	7	5	26	28	27	14	1	3	9	15	12	158	134
Ole	Rainfall in ins. ...	5.40	2.78	4.28	13.75	25.77	11.37	1.72	0.31	0.09	0.91	1.81	1.55	69.74	53.52
	No. of wet days ...	10	5	7	20	29	22	13	3	5	5	9	9	135	106
Chambani	Rainfall in ins. ...	4.80	1.34	3.09	14.27	38.74	8.48	2.52	–	–	0.75	1.74	4.99	80.72	79.74
	No. of wet days ...	10	4	4	18	27	12	8	–	–	4	7	13	107	99
Kisongoni	Rainfall in ins. ...	2.60	3.80	2.67	14.07	18.48	4.86	2.68	1.81	1.55	0.85	4.23	4.58	62.18	49.49
	No. of wet days ...	7	5	4	21	26	16	7	7	6	3	9	11	122	109
Chake Chake ...	Rainfall in ins. ...	6.17	2.23	6.85	16.93	43.48	31.22	5.28	1.46	0.19	0.55	7.13	15.50	136.99	65.66
	No. of wet days ...	10	4	8	21	28	22	13	2	1	2	11	15	137	118
Selem	Rainfall in ins. ...	2.14	2.70	3.68	14.26	16.82	5.14	0.87	1.29	1.67	1.81	5.02	2.27	57.67	49.38
	No. of wet days ...	8	6	6	23	26	14	9	6	14	8	18	14	152	142
Chwaka	Rainfall in ins. ...	1.95	0.50	0.80	19.45	24.17	4.95	2.30	0.85	1.78	0.40	2.10	1.76	61.01	43.89
	No. of wet days ...	3	1	1	16	15	7	4	2	5	2	3	5	64	93
Kizimbani ...	Rainfall in ins. ...	4.81	3.07	3.98	17.44	20.91	6.84	1.67	2.00	1.29	1.51	6.63	3.41	73.56	63.26
	No. of wet days ...	10	7	7	23	27	16	9	5	8	6	18	12	148	149
Victoria Gardens ...	Rainfall in ins. ...	2.69	5.13	2.80	15.45	16.74	4.11	1.43	0.11	0.63	1.85	9.94	5.97	66.85	44.76
	No. of wet days ...	9	5	6	21	20	11	8	1	2	9	15	13	120	117
Makunduchi ...	Rainfall in ins. ...	2.28	6.01	3.26	19.32	28.67	5.73	1.02	0.13	0.40	0.65	0.59	5.55	73.61	39.59
	No. of wet days ...	8	6	5	18	20	13	4	1	5	2	3	7	92	51
Mwera	Rainfall in ins. ...	4.27	5.99	5.28	14.52	13.93	7.29	0.94	1.54	0.39	7.47	15.09	8.35	85.06	73.11
	No. of wet days ...	5	5	6	17	13	8	8	3	2	5	16	12	100	93
Hanyegwa Mchana	Rainfall in ins. ...	2.94	3.89	2.07	17.69	22.28	7.38	2.29	1.11	1.04	1.14	5.95	2.92	70.70	49.56
	No. of wet days ...	6	7	6	24	27	17	8	5	8	7	12	11	138	89
Muongoni	Rainfall in ins. ...	2.27	7.23	3.05	13.82	19.33	6.71	1.98	0.64	0.93	0.55	3.12	6.96	66.59	*
	No. of wet days ...	8	6	10	19	26	19	12	5	5	4	14	10	138	*
Kisauni	Rainfall in ins. ...	2.37	4.30	4.73	15.79	16.76	4.53	1.56	0.16	1.01	0.76	6.62	6.49	65.08	49.46
	No. of wet days ...	12	5	9	22	24	12	10	2	6	7	15	15	139	129

*Record incomplete.